CMPT 310 - Artificial Intelligence Survey

Assignment 1

Due date: February 5, 2018   J.P. Delgrande

10 marks   January 17, 2018

Important Note: Students must work individually on this, and other CMPT 310, assignments. You may not discuss the specific questions in this assignment, nor their solutions with any other student. You may not provide or use any solution, in whole or in part, to or by another student.

You are encouraged to discuss the general concepts involved in the questions in the context of completely different problems. If you are in doubt as to what constitutes acceptable discussion, please ask!

This problem involves path finding in a $n \times n$ grid, where each square has a non-negative integer giving the "cost" of being in that square. It is possible to move from a location to any of its 4 neighbours (except at the boundary). The cost of a move is ($1 +$ the value at the square to be moved to). You are given a starting position on the grid and a goal location. The goal is to determine the least cost path from the start location to the goal location.

Here is an example of a grid. The start could be for example (1,1) and the goal (5,4)

5	4	3	3	2	4
4	2	3	4	5	2
3	3	4	5	3	2
2	2	4	4	2	2
1	4	3	3	4	2
	1	2	3	4	5

Write a program in Python that reads in a problem specification in the folowing order: the grid size, the start location, the goal location, and the array of values. The program should output the least cost path. Testing should be on at least a 5×5 grid and, of course, fully testing your algorithm. As well, a test case will also be provided later.

You should submit the following:

- Your program.

- Testing. This should convincingly illustrate that your program does what it is supposed to, with notes if needed.

- Documentation. You should describe and justify your choice of search procedure. As well, the documentation should describe your program at a high level. If you did anything particularly nice, please document that also.